

Claims

We claim:

- 1 1. A method of treating a behavioral or psychological deficit in an animal which
2 comprises intracerebral transplantation of a therapeutically effective amount of pluripotent
3 neuroepithelial cells to said animal.
- 1 2. The method of claim 1, wherein tests for cognitive function are carried out before
2 and after transplantation of said pluripotent neuroepithelial cells.
- 1 3. The method of claim 1, wherein said cells are conditionally immortal.
- 1 4. The method of claim 1, wherein said cells are isolated.
- 1 5. The method of claim 1, wherein said animal is a human.
- 1 6. The method of claim 1, wherein said cells are from a single cell line.
- 1 7. The method of claim 1, wherein said cells are a mixture of cells from two or more
2 cell lines.
- 1 8. The method of claim 1, wherein said cells have a high degree of potency.
- 1 9. The method of claim 1, wherein the proliferation of said cells is increased by the
2 addition of FGF2 *in vitro* under both permissive and non-permissive conditions.

1 10. The method of claim 1, wherein said cells differ from those found in nature only
2 in that said cells comprise exogenous DNA necessary to provide conditional immortality,
3 and optionally to allow cloning.

1 11. The method of claim 1, wherein said behavioral or psychological deficit is the
2 result of hypoxia.

1 12. The method of claim 1, wherein said cells are human cells.

1 13. Pluripotent, neuroepithelial cells for therapeutic treatment of an animal.

1 14. The cells of claim 13, wherein said cells are for therapeutic treatment of a
2 behavioral or psychological deficit of said animal.

1 15. The cells of claim 13, wherein said cells are conditionally immortal.

1 16. The cells of claim 13, wherein said cells are isolated.

1 17. The cells of claim 13, wherein said animal is a human.

1 18. The cells of claim 13, wherein said cells are from a single cell line.

1 19. The cells of claim 13, wherein said cells are a mixture of cells from two or more
2 cell lines.

1 20. The cells of claim 13, wherein said cells have a high degree of potency.

1 21. The cells of claim 13, wherein the proliferation of said cells is increased by the
2 addition of FGF2 *in vitro* under both permissive and non-permissive conditions.

1 22. The cells of claim 13, wherein said cells differ from those found in nature only
2 in that said cells comprise exogenous DNA necessary to provide conditional immortality,
3 and optionally to allow cloning.

1 23. The cells of claim 14, wherein said behavioral or psychological deficit is the
2 result of hypoxia.

1 24. The cells of claim 13, wherein said cells are human cells.

1 25. A conditionally immortal, pluripotent, neuroepithelial cell line for therapeutic
2 treatment of an animal.

1 26. The cell line of claim 25, wherein said cell line is for the treatment of a behavioral
2 or psychological deficit of said animal.

1 27. The cell line of claim 25, wherein said animal is a human.

1 28. The cell line of claim 25, wherein said cell line is from a single cell line.

1 29. The cell line of claim 25, wherein said cell line is a mixture of cells from two or
2 more cell lines.

1 30. The cell line of claim 25, wherein cells of said cell line have a high degree of
2 potency.

1 31. The cell line of claim 25, wherein the proliferation of said cell line is increased
2 by the addition of FGF2 *in vitro* under both permissive and non-permissive conditions.

1 32. The cell line of claim 25, wherein said cell line differs from cells found in nature
2 only in that cells of said cell line comprise exogenous DNA necessary to provide conditional
3 immortality, and optionally to allow cloning.

1 33. The cell line of claim 26, wherein said behavioral or psychological deficit is the
2 result of a transient loss of blood supply to the brain of said animal.

1 34. The cell line of claim 25, wherein cells of said cell line are human cells.

1 35. A process for the production of human, conditionally immortal, pluripotent,
2 neuroepithelial cells which comprises the steps of:

3 (a) obtaining neuroepithelial cells from a human fetus, said neuroepithelial
4 cells being at a stage early enough in the developmental pathway that said
5 neuroepithelial cells have the ability to differentiate into a variety of different brain
6 cell types;

7 (b) introducing into said neuroepithelial cells DNA which comprises a
8 sequence capable of causing said neuroepithelial cells to be conditionally immortal
9 under the control of appropriate control elements; and

10 (c) maintaining said neuroepithelial cells *in vitro* under permissive conditions.

1 36. The process of claim 35, which further includes the step of cloning said
2 neuroepithelial cells to obtain one or more cell lines.

1 37. A pharmaceutical composition comprising cells of claim 13 and a
2 pharmaceutically acceptable carrier.

1 38. A pharmaceutical composition comprising cells from the cell line of claim 25
2 and a pharmaceutically acceptable carrier.

1 39. A pharmaceutical composition comprising cells obtained according to the
2 process of claim 64 and a pharmaceutically acceptable carrier.

1 40. A method of testing comprising maintaining a population of cells of a
2 conditionally immortal pluripotent neuroepithelial cell line *in vitro* and culturing portions
3 of said cells under permissive conditions in the presence and absence of a growth factor and
4 determining the proliferation of the cells.

1 41. The method of testing according to claim 40, which further comprises culturing
2 portions of said cells under non-permissive conditions in the presence and absence of a
3 growth factor and determining the proliferation of said cells.

1 42. A mammal which has undergone the method of treatment according to claim 1.

1 43. A cell line comprising conditionally immortal, pluripotent, neuroepithelial stem
2 cells, wherein said cell line is obtainable by culturing said stem cells under permissive
3 conditions in serum-free medium.

1 44. The cell line of claim 43, wherein said serum-free medium comprises a growth
2 factor.

1 45. The cell line of claim 44, wherein said growth factor is FGF2.

1 46. Cells obtainable from a cell line of claim 43.

1 47. The cells according to claim 46, wherein said cells are for use in a method of
2 therapeutic treatment of an animal.

1 48. The cells according to claim 47, wherein said therapeutic treatment is a treatment
2 of a behavioral or psychological deficit of said animal.

1 49. A method of treating an animal having a damaged brain, said method comprising
2 intracerebral transplantation of a therapeutically effective amount of a cell line into the
3 damaged brain of said animal, said cell line comprising conditionally immortal, pluripotent,
4 neuroepithelial stem cells, wherein said cell line is obtainable by culturing said stem cells
5 under permissive conditions in serum-free medium into the damaged brain of said animal.

1 50. The method of claim 49, wherein said serum-free medium comprises a growth
2 factor.

1 51. The method of claim 49, wherein said growth factor is FGF2.

1 52. A method for treating a behavioral or psychological deficit caused by damage
2 to, or loss of, brain cells in a mammal which comprises intracerebral transplantation to said
3 mammal of undifferentiated pluripotent cells having neuronal and glial potential, wherein
4 said transplanted cells migrate and differentiate to replace, or compensate for, said lost or
5 damaged brain cells.

1 53. The method of claim 52, wherein said undifferentiated pluripotent cells are
2 conditionally immortal.

1 54. The method of claim 52, wherein said undifferentiated pluripotent cells are
2 nestin-positive prior to said intracerebral transplantation.

1 55. The method of claim 52, wherein said undifferentiated pluripotent cells are from
2 a clonal cell line.

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